EPA Region 7 TMDL Review

TMDL ID:	IA 02-IOW-0030	**Waterbody ID(s):**	IA 01-IOW-0030-2
Waterbody Name(s):	Iowa River		
Tributary(ies):	Coralville Reservoir discharge, Clear Creek, Rapid Creek, Muddy Creek, Sanders Creek		
Pollutant(s):	Pathogens		
State:	IA	**HUC(s):**	0708020906
Basin:	Iowa River		
Submittal Date:	March 22, 2007		
Approved:	May 31, 2007		

Submittal Letter

State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.

Letter for Iowa River, dated March 20, 2007, was received by EPA on March 22, 2007, formally submitting this TMDL for approval.

Water Quality Standards Attainment

The water body's loading capacity (LC) for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.

Bacteria waterbody loading capacity cannot be reasonably expressed as a mass per time. Because the risk and corresponding water quality criteria associated with bacteria are based on epidemiological studies relating illness rates to concentration, this TMDL are expressed as a relationship of concentration at a continuum of flow conditions, as shown on the duration curve in Figures 7 through 11. This concentration is 126 organisms /100 ml for the geometric mean or 235 organisms / 100 ml for the single sample maximum. The targets given should result in attainment of water quality standards.

Numeric Target(s)

Submittal describes applicable WQS, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The Iowa E. coli Bacteria Criteria for primary contact recreation are a season geometric mean of 126 organisms/100 ml of water and a single sample maximum value of 235 organisms/100 ml of water. The applicable designated uses are primary contact recreation, aquatic life protection, and drinking water supply.

Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.

Links between pollutant and target are direct. This TMDL is expressed as a percentage of reduction in loading to achieve a fecal coliform target that is set at the E. Coli standard. The margin of safety is thereby implicit due to targeting historic fecal coliform reductions at the present E.coli standard. Point source WLA's require that end of pipe discharges meet the E. coli WQS concentration for discharges directly into the impaired segment. WLAs in tributaries are set such that the concentration will be at WQS when the load reaches the impaired segment. Iowa R. nonpoint source (NPS) loads must be reduced 94% from existing loads.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.

Both point and nonpoint sources of pathogen indicators have been identified as the cause of the primary contact recreation use impairment on the Iowa River.

The Iowa River is a tributary of the Mississippi River and is about 300 miles long. Iowa City, where the impaired segment is located, is 65 miles from its mouth. The Iowa River originates from two branches (West and East) that have their headwaters in Hancock County. The Iowa River flows in a generally southeast direction to the Mississippi and it is dammed north of Iowa City to form Coralville Reservoir. The lower reaches are located in the Southern Iowa Drift Plain and the Mississippi Alluvial Plain. The direct drainage area land use (below Coralville Reservoir) is predominantly row crop (40%) with 11% of the land cover urban.

Nonpoint sources are identified as land application of livestock manure from feed lots, livestock in pastures, failing septic systems and wildlife. These are quantified by subbasin and source (including livestock type and land use) by use of the bacterial indicator tool (BIT).

There are ten municipal wastewater treatment plants and four municipal stormwater discharge facilities within the Iowa River watershed. The only permitted facility in the watershed with a pathogen indicator discharge limit is the North Liberty wasterwater treatment plant. NPDES facilities and their wasteload allocations are shown in the WLA section below. There are no permitted feedlots in the impaired Iowa River segment watershed.

It seems all sources have been identified.

Allocation - Loading Capacity

Submittal identifies appropriate WLA for point, and load allocations for nonpoint sources. If no point sources are present the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2(i)]. If this is a phase II TMDL the change in LC will be documented in this section.

Wasteload allocations have been assigned to wastewater treatment plants based on their distance from the impaired reach taking into account natural attenuation and decay in the bacteria concentration in the tributaries. Currently Iowa TMDL wasteload allocations are for E. coli and NPDES permit bacteria limits are in fecal coliforrn concentrations. There are four MS4 discharge permits in the watershed as shown in Table 22. Stormwater runoff from Coralville and North Liberty and a large part of runoff from Iowa City and the University of Iowa flows to the impaired Iowa River segment. Load allocations for nonpoint sources should achieve the water quality standard geometric mean of 126 E. coli organisms per 100 ml. The land areas covered under the MS4 permits are shown in Table 22. In the Iowa R. Nonpoint source (NPS) loads must be reduced 94% from existing loads.

WLA Comment

Submittal lists individual WLAs for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.

Currently, only North Liberty wastewater treatment plant currently has wasteload allocations for E. coli and NPDES permit limits for fecal coliform that are the equivalent risk to the E. coli WLA. The wasteload allocations for point source dischargers to the Iowa River will be equivalent to the water quality criteria associated with the primary contact recreation beneficial use. Therefore, the WLA is a monthly geometric mean of 126 counts per 100 ml and a maximum daily value of 235 counts / 100 ml for facilities discharging directly to the impaired reaches or a higher value for those contributing to tributaries of the impaired reaches. There are no permitted feedlots in the impaired Iowa River segment watershed.

Table 21 Permitted Wastewater Treatment Plant discharge Wasteload Allocations

NPDES PERMITTED MUNICIPAL/SEMI-PUBLIC TREATMENT FACILITIES			Die off Coefficient, one/day [3]		0.96	
			Stream Velocity (miles per day)		16	
City Name	**EPA NPDES ID**	**Receiving Stream**	**Miles to Impaired Reach**	**Fraction after Decay**	***E. coli* WLA[2]**	
					Geometric mean	**Sample Max.**
City of North Liberty STP[1]	IA0032905	Muddy Creek	5.3	0.73	173	323
Amana-Nordstrom Inc.	IA0066265	Unnamed Tributary to Clear Creek	25.0	0.22	565	1054
Colony Investment Services - STP	IA0074225	Unnamed Tributary to Clear Creek	25.7	0.21	589	1099
Colony Village Restaurant	IA0069035	Unnamed Tributary to Clear Creek	24.6	0.23	552	1030
Days Inn	IA0065838	Unnamed Tributary to Clear Creek	24.6	0.23	552	1030
Oxford, City of STP	IA0032531	Hertzel Run to Clear Creek	14.9	0.41	308	574
Parkview Mobile Home Court	IA0068349	Clear Creek	14.0	0.43	292	545
Sleepy Hollow Campground	IA0069094	Unnamed Tributary to Clear Creek	18.8	0.32	389	726
Tiffin, City of STP	IA0036617	Clear Creek	7.7	0.63	200	373
Timber Trails Estates Homeowner's Assoc.	IA0069108	Sanders Creek to Iowa River	3.1	0.83	152	283

1. The North Liberty wastewater treatment plants currently have wasteload allocations for *E. coli* as shown above and NPDES permit limits for fecal coliform that are the equivalent risk to the *E. coli* WLA.
2. Units are *E. coli* organisms/100 ml.
3. The standard die off equation is $C_x = C_o / e^{kt}$
   Where: Co = Initial bacteria count organisms/100 milliliters or organisms per day at the discharge.
   C_x= Concentration or daily load at a point distance "x" downstream of the discharge.
   k = first order decay coefficient, 0.96/day
   t = time of travel, days

Table 22 Municipal NPDES MS4 Stormwater Permits and Wasteload Allocations

CITY NAME	EPA NPDES ID	RECEIVING STREAM	MILES TO IMPAIRED REACH	AREA COVERED UNDER MS4, SQ. MI.	WASTELOAD ALLOCATION[1]
Coralville MS4	IA0078646	Clear Creek	3.1 (5.0 km)	10.2	BMP
Iowa City MS4	IA0078298	Iowa River	0	24.4	BMP
North Liberty MS4	IA0078794	Muddy Creek	5.3 (8.5 km)	6.8	BMP
Univ. of Iowa MS4	IA0078182	Iowa River	0	Included in Iowa City area	BMP

1. Wasteload allocations for the MS4 permits are associated with best management practices (BMP) to control bacteria.

LA Comment

Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.

Runoff conditions are strongly tied to elevated bacteria levels, therefore, load allocations assigned to these TMDL will be based upon the geometric mean of 126/100 ml - applicable target water quality criteria for E. coli. The cause and effect relations to manure applications timing was not established. Existing loads were modeled using QUAL2K, subbasin reductions were determined using the results of this model such that the sum of loads to the impaired segment will not exceed the water quality criterion. These loads are expressed as load duration curves which quantify the LA at all flow percentiles.

Margin of Safety

Submittal describes explicit and/or implicit MOS for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a phase II TMDL any differences in MOS will be documented in this section.

This TMDL is expressed as a load reduction set at the E. coli standard. The margin of safety is thereby implicit due to targeting fecal coliform reductions at the E. coli standard level. An additional implicit margin of safety is included based on the conservative assumptions of minimum diluting outflow from Coralville Reservoir.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of WQS. If this is a phase II TMDL any differences in conditions will be documented in this section.

These TMDLs were developed based on the Iowa water quality standards primary contact recreation season that runs from March 15 to November 15. The most critical flow conditions occurs when the Coralville discharge is lowest, it rains in the directly draining watershed, and the runoff flows become a significant fraction of the Iowa River volume between the two dams. The use of load duration curves also addresses seasonal variation by expressing the TMDL at all possible levels of discharge.

Public Participation

Submittal describes required public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

Public meetings to discuss the Iowa River TMDL project reports and activities were held on September 14, at the Iowa City Water Supply Plant. A second public meeting was held on January 31, 2007 to discuss and present the draft TMDL. Comments received were reviewed and given consideration and, where appropriate, incorporated into the TMDL.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used) [40 CFR § 130.7].

Monitoring of the Iowa River bacteria will continue at the upstream (IR1) and Burlington Street dam (IR3) sites as part of the continuing Coralville Water Quality Monitoring Project and the IDNR ambient monitoring program. Data collected at these sites will continue to be used by the IDNR for its biannual water quality assessments (305(b) report) of the Iowa River. There is also a plan to continue the targeted monitoring through 2007, although sampling will be done bi-monthly rather than weekly and it will be only for E. coli bacteria and nitrate and ammonia.

Reasonable assurance

Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads.

WLA are implemented through the Iowa NPDES permitting procedure following rules in the 1AC (567-64). Further pathogen indicator reductions below the wasteload allocations in this document cannot improve Iowa River compliance with the water quality standards and as such reasonable assurances are not required. The submittal does define reasonable assurance for nonpoint sources will be accomplished through methods and projects that reduce the impacts of livestock as described in Section 4: Implementation Plan which EPA does not review.